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GEOPHYSICAL VARIABLES AND BEHAVIOR: XXXV. POSITIVE CORRELATIONS BETWEEN NUMBERS OF UFO REPORTS AND EARTHQUAKE ACTIVITY IN SWEDEN

DAN MATTSSON[1] AND M. A. PERSINGER[2]
Laurentian University

Summary.—The numbers of major UFO reports per 6-mo. increment and the numbers of earthquakes per 6-mo. increment within Sweden were calculated for the years 1963 through 1977. Symmetrical lag/lead multiple regression analyses gave a positive intermediate strength correlation (0.59) between the numbers of earthquakes per increment and the numbers of UFO reports (UFORs) during the previous increment only. These results are similar to UFOR-seismic temporal relationships that have been found in the central USA, Utah, Washington State, and Manitoba. These patterns strongly suggest a general relationship between reports of luminous phenomena, frequently labelled as UFOs, and consequent seismic activity.

A temporal relationship between the numbers of UFO reports (UFORs) or LP (luminous phenomena) and earthquake activity within a region has been reported for the central USA (Persinger, 1980), Washington State (Persinger & Derr, 1984), the Uinta Basin, Utah (Persinger & Derr, 1985a), Carmen, Manitoba (Persinger & Derr, 1985b), and the Toppenish Ridge, Washington (Derr & Persinger, 1986). Except for one historical study (Persinger, 1984), no systematic analyses have been completed for countries outside of North America. Because a previous pilot study (Mattson, 1984) indicated a temporal relationship between UFORs and earthquake activity in Sweden, we decided to analyze these data using statistical techniques similar to those of previous studies.

Total numbers of UFORs, primarily flap reports or episodes of multiple sightings for the years 1963 to 1978, were taken from the first author's data base; they are based primarily on published newspaper accounts and the SWECAT file. Numbers of earthquakes were obtained from the Department of Seismology, University of Uppsala.[3] The magnitudes (M_L) of detected earthquakes within Sweden during this period were relatively small (mean 2.7) ranging from 1.8 to 3.9 M_L (UPP). The total numbers of UFORs for 1963-1978 within Sweden were 463; numbers of earthquakes were 147.

On the basis of previous studies (Persinger, 1980; Persinger & Derr, 1984) that involved areas of similar sizes, a 6-mo. increment of temporal analysis was selected. The total numbers of earthquakes and UFORs that occurred between January-June and July-December for each year for the 15 yr. ($n = 30$ cases) were determined. The major analysis was a multiple

[1]P1 7259, S-611, 90 Nyköping, Sweden.
[2]Environmental Psychophysiology Lab, Department of Psychology, Laurentian University, Sudbury, Ontario, Canada P3E 2C6.
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regression symmetrical lag/lead procedure (Persinger, 1983). In this procedure, four lag variables for both the numbers of earthquakes per 6-mo. increment ($M \pm SD = 4.8 \pm 3.3$) and the numbers of UFORs per 6-mo. increment (15.4 ± 12.0) were calculated. Lag 2 of the earthquakes was then used as the dependent variable and all four lags plus the no-lag variables for the (square root of) numbers of UFORs were allowed to enter the equation. This gave an equal opportunity for UFORs to enter before, during, or after the increment of earthquake activity and is used as an indicator of temporal direction. Following previous assumptions concerning social facilitation of reporting, square-root transformations of numbers of UFORs were used.

The results were similar to previous studies. Only the Lag 3 UFOR variable entered the equation; this meant that earthquake activity was associated with the number of UFORs from the previous 6-mo. increment. The correlation coefficient was 0.59 ($df = 28, p = .001$); this meant that an increase in UFORs was associated with an increase in numbers of earthquakes within Sweden during the next 6-mo. increment. Visual inspection of the scattergram for numbers of UFORs and earthquakes indicated that the effect was homogeneous and not due to outliers. The Spearman *rho* (nonparametric analysis) coefficient was 0.58 ($p = .001$). All analyses were completed by SPSSX on a DEC2020 computer.

These analyses further support a temporal link between the occurrence and the numbers of major luminous phenomena or UFORs and earthquake activity within a region. These results are compatible with the tectonic strain hypothesis (Persinger, 1983) that luminous phenomena and UFORs are associated with stress and strain within the earth's crust. The results also indicate that the phenomena or UFORs tend to be associated with seismic events of low magnitude and that more comprehensive data on seismic and luminous phenomena are required to understand their intricate relationships.

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